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ABSTRACT

This paper begins by defining the terms "weight training," "weight lifting," "strength," "power," and "muscular endurance." "Weight training" is differentiated from "weight lifting" and defined as a systematic series of resistance exercises designed to promote physical development and conditioning or to rehabilitate persons who have suffered injury or illness. General principles of weight training are listed. The remainder of the paper is divided into the following sections: (a) a weight circuit for strength development--a description of a training program designed to accommodate a large number of students working simultaneously within a short time during the physical education instructional period; (b) a power training circuit; (c) description of weight training exercises; and (d) a description of calisthenic exercises. (JA)

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PRESIDENT'S COUNCIL ON PHYSICAL FITNESS AND SPORTS

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WEIGHT TRAINING FOR STRENGTH AND POWER

Definitions and Values

Weight training is a systematic series of resistance exercises designed to promote physical development and conditioning or to rehabilitate persons who have suffered injury or illness. The term is differentiated from weight lifting which is the practice and participation in certain lifts in competition.

Until comparatively recent years, weight training was questioned by athletic coaches and physical educators, but it is now almost universally accepted as an effective, efficient means of developing strength, power, endurance and flexibility.

Strength is the ability to exert force or overcome resistance and is an important component in sports performance and many forms of physical work.

Power, as used here, refers to a combination of strength and speed. It is the ability to apply strength in an "explosive" movement.

Muscular endurance is the ability of the muscles to continue to contract--to do work--over long periods.

Weight training, when performed properly, may contribute to flexibility, the ability of the joints to move through a full range of motion. Flexibility is enhanced when opposing muscles are in balance and the muscles and connective tissue are of proper length and elasticity.

Training with weights, under certain conditions, may also contribute to another major component of physical fitness--circulatory endurance, the efficiency of the cardiovascular and respiratory systems. Such conditions require that the exercises be done rhythmically and consecutively with only short rests (30 secs. or less) in between exercise bouts. Otherwise, minimal circulatory improvement will be gained.

Because of its effectiveness and the fact that rather precise routines of progressively increased resistance can be set up, the use of weight training is increasing rapidly in: (1) athletic conditioning and skill training; (2) school and college physical education; (3) fitness programs of public and voluntary recreation agencies; (4) rehabilitation work of medical and ancillary units; and (5) individual conditioning regimens.

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A well-chosen sequence of weight exercises, pursued regularly over a period of time can bring about significant improvement in the fitness components mentioned above. Physical condition, posture, and appearance can be improved, body measurements reapportioned and sagging body contours firmed up. Weight training is particularly worthwhile in helping the physically underdeveloped person because the regimen and goals can be easily adapted to individual needs and capacities. Even the weakest and smallest student can be challenged to improve. Progress is obvious in a relatively short time and is satisfying and stimulating to further effort.

Important psychological benefits in poise, self-discipline, self-direction, and self-realization are often derived.

Significant improvement in sports performance can be obtained through selected exercises as well as through those that build overall strength, flexibility, power and endurance.

Although most existing weight-training programs are for men and boys, women and girls can benefit too. Progressive resistance exercises can be easily adapted to each girl's capacity, ability and needs. Most American girls lack adequate strength in arms, shoulders and trunk, and could profit from a developmental routine. Consider, for example, the fact that the age at marriage is earlier in general now than in the past. Many young ladies will be raising families while still in the teens and early twenties. An infant at birth weighs seven or eight pounds, and grows rapidly to 20 pounds within the first year, and in many cases reaching 25-30 pounds before it begins to walk. The young mother who lifts this child 100 or more times a day, in addition to all of life's other demands, requires considerable physical reserves!

The fear that weight exercises will develop bulky, mannish, overly-muscled women is not well founded. In fact, the opposite--a trim, firm, well-contoured figure is usually found among women who undertake regular exercise of this kind.

The difference between weight training for girls and boys is the goal sought, the social setting, and the amount of weight used.

The training program consists of several exercises (called lifts) with barbells or dumbbells. Each time the weight is lifted in the exercise is called a repetition. Thus, 10R stands for 10 repetitions. The symbol 10RM means the maximum amount of weight that can be lifted 10 times consecutively.

Correspondingly, 1RM and 5RM mean the maximum amounts that can be lifted once and five times, respectively, in a particular way. The performance of an exercise a certain desired number of times is called a set. Thus, if an exercise is performed three times for, let us say, 6R, 8R, and 10R, three sets have been carried out. The selection of exercise routines, the amount of weight used, the number of repetitions and sets performed are adjusted to the individual according to his capacities and objectives.

General Principles of Weight Training

Considerable study has been made of the most effective ways to train with weights. Berger* has examined a number of research studies and the following are among his conclusions:

1. Training with submaximal loads of as low as two-thirds or more of maximum strength twice weekly, and maximal loads once weekly will result in as much strength improvement as training maximally three times weekly.

2. The load with which to train for optimum improvement in strength, when training three times weekly for one set each, lies between the 3RM and 9RM.

3. Training with the 2RM for six sets, three times weekly, is as effective for increasing strength as training with the 6RM for three sets, three times weekly.

4. Training with the 6RM for three sets, three times weekly is more effective for increasing strength than training with either the 2RM or 10RM for three sets, three times weekly.

5. Training once weekly with the 1RM for one set will increase strength significantly after the first week of training and each week up to at least the sixth week.

6. Weight training with the 10RM for three sets, twice weekly, is just as effective for increasing strength as training the same way three times weekly.

7. No particular sequence of performance in training with different proportions of 10RM maximum strength will be more effective than any other sequence for strength improvement as long as one set of 10RM is performed each training session.

8. Three sets for each lift are more effective for increasing strength than training for one or two sets.

*Berger, Richard A. Application of Research Findings in Weight Training. Publication pending in Strength and Health.

9. The number of training days per week for optimum improvement in strength is not known. Significant increases have occurred training one day weekly to five days per week for beginners, but in these instances only one lift was performed.

10. Training with several lifts, four or five days per week, may not be as effective for increasing strength as training the same way two or three times per week. The greater muscular fatigue experienced from training more frequently may prevent sufficient recuperation between training sessions and, therefore, reduce the rate of progression.

11. A program of three training sessions per week, provided the number of different lifts is not excessive, should not be too few for excellent results. A beginner should start with eight to ten lifts and then add or reduce this number according to his recuperative ability. A fourth workout per week may be added later when the individual attains improved physical condition.

These conclusions are based primarily on adult college-age subjects with little or no previous experience in weight training and, in most cases, the length of the studies did not exceed 12 weeks.

A Weight Circuit for Strength Development

This training program was designed to accommodate a large number of students working simultaneously within a relatively short time during the physical education instruction period. It attempts to utilize the principles derived through research, while adapting to a range of individual differences. Obviously, some compromises must be made between this program and one where just one or a few individuals are working and are taking time to change the weight load frequently and make other adjustments.

The procedure is highly organized and teacher-directed, but the students will understand that this is necessary in order to realize optimum results for all in a limited time.

General Description of the Circuit Method

The circuit consists of eight stations at which a weight resistance exercise is performed--a different lift at each station. The exercises are selected to give a well-rounded workout employing all or most muscle groups.

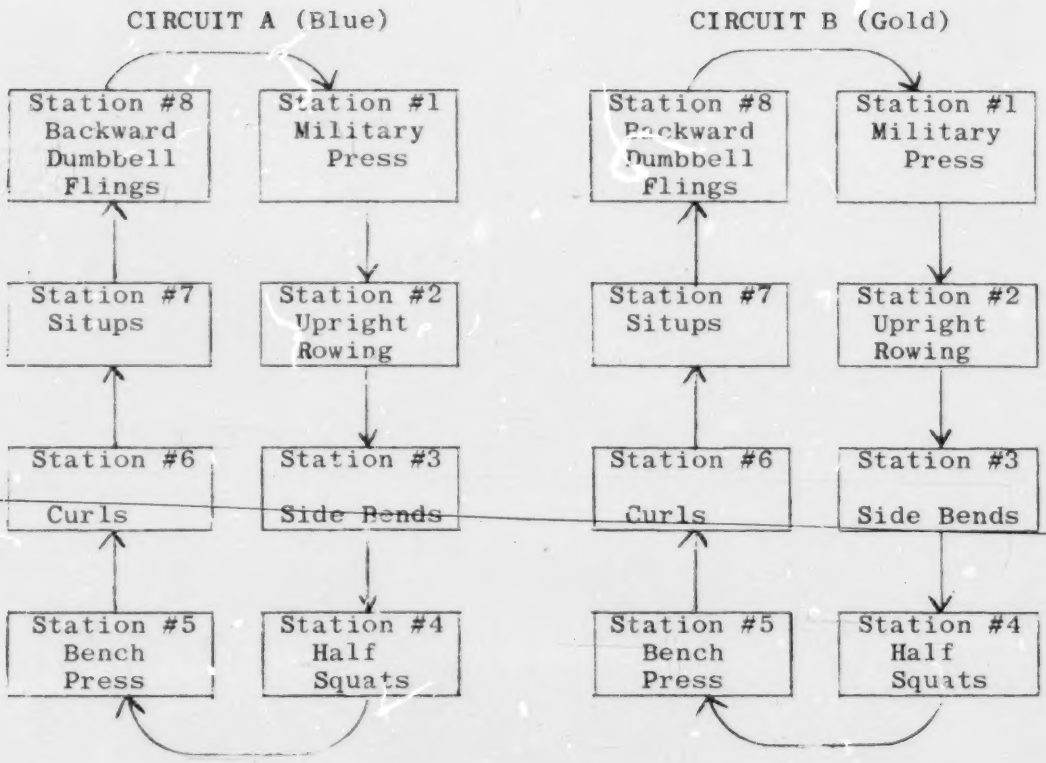
Teams of three boys are assigned to each station. One performs the exercise prescribed for that station, while the other two act as spotters. They rotate, so that each, in turn, does the exercise. When all three have completed their lifts at that station, the teams move to another station according to a system of rotation until each boy has performed all eight exercises.

In order to accommodate a wider range of abilities, two circuits (two sets of eight stations) should be established and the class divided into two basic groups. Each group is then organized into the eight teams of three. Thus, 48 boys can be involved, 24 in each circuit. A method of grouping the students is suggested below.

Of course, if the instructor desires a finer breakdown and has the facilities and equipment, more than two circuits can be set up.

Arrangement of Stations

The stations are laid out as shown in the illustration, eight in each circuit. The exercises are identical for the corresponding stations in the two circuits but the amount of weight used in the exercises of Circuit A is less than that used in Circuit B. (Colors, e.g., the school's colors, Blue and Gold, can be used to designate the circuits, or names of athletic teams, e.g., Tigers, Colts, or perhaps, even the Astronaut series, e.g., Apollo and Gemini.)



The exercises are described in a later section.

Teams rotate clockwise from one station to the next.

Each station consists of a mat and the barbell or dumbbells required for the particular exercise. The load is pre-set as described below, so it is not necessary to stop and change weights during the routine.

A large card is posted in front of each station giving the station number and name, and a description of the exercise.

Procedures

The class is called to order with teams at their assigned stations for the beginning of the circuit. The instructor gives the following commands:

"Teams attention!" (No. 1 man in position to lift; No. 2 on his left, and No. 3 on his right)

"Spotters, check weights" (Nos. 2 and 3 make sure the collar is tight and close against the outside weight--on their respective sides of the barbell--or on the nearest dumbbell)

"No. 1 Man Up"--(No. 1 is alerted to lift)

"No. 1 Man Take Weight"--(No. 1 lifts the weight to the starting position; where necessary, as in the bench press, Nos. 2 and 3 assist him)

"Ready; Exercise"--(No. 1 performs the exercise trying to do the desired number of repetitions and places the weight back on the mat when he is finished; Nos. 2 and 3 act as spotters)

"No. 2 Man Up"--(No. 2 takes his place to lift, exchanging with No. 1)

The procedure is repeated for No. 2 to exercise and then for No. 3. (Nos. 2 and 3 exchange positions)

When No. 3 is finished, the instructor calls, "Teams Rotate" (The three men move to the next station, clockwise, ready to repeat the procedure with the exercise assigned there.)

The exercise interval should take about 20 seconds, and the change from one exerciser to the next, about 10 seconds. Rotation of teams and checking weights, about 15-30 seconds, so the time for one complete circuit is about 14-15 minutes. The instructor should be alert to note any slowdowns and correct them. He may also control the time more precisely by using a whistle--one blast to begin exercising, two to stop.

Variations: 1. After a few days' experience, at most of the stations except #4, Half Squats, and #5, Bench Press, the spotters should run in place, hop on one foot or both, or do some other appropriate exercise, while one man is lifting. This introduces additional vigorous activity and increases the circulatory response.

2. When the students have learned the routine, a student-leader can give the commands and the teacher can give more attention to individual needs.

Tape Recording: The instructor can make a tape recording of his directions and commands, and even add background music during the exercising interval. By playing the tape, he can be free to move around and give specific assistance or instruction as needed.

Determining Weight Loads and Repetitions

After organizing two basic groups, the instructor will need to do some testing and checking at each weight station to determine the proper weight load. He should try to find an amount that permits a range of about 3RM (weakest student in the group) to 7RM (by the strongest). Each boy would be working to increase the number of maximum repetitions as he improves in strength during the course. When 10-12RM is reached by the stronger boys, then the weight resistance can be increased.

A Method of Grouping

Berger* has devised a method of grouping students according to body weight and maximum number of pull-ups performed. Table I is used for that purpose. Example: An individual weighing 135 lbs. can chin himself 10 times. By using the table we find that a person who weighs 130 lbs. and can do 10 chins is given 175 points, while a 140-lb. person doing 10 chins earns 189 points. Therefore, 135 lbs., half-way between these two, earns 182 points.

By finding the point-values for each boy in the class and putting them in rank order, the instructor can find the mid-point and divide the class into two groups. The same procedure can be used to classify into three or four groups if a finer breakdown is required.

Many schools already administer the pull-up test as part of their fitness battery and, therefore, have this information on hand.

Individual Records

A record should be kept of each individual's progress. Each student should record his performance at each station every time he goes through the circuit. His objective is to increase the maximum number of repetitions at a certain weight load until 10 to 12 are reached. Then the weight is increased. See sample record in later section.

Teaching Hints and Safety Precautions

1. Before putting the class through the full circuit, introduce the exercises over a period of three or four days, making certain that all students learn to execute each lift properly.

*Berger, Richard A. Determination of Chinning Strength from Chins Performed at Bodyweight. Publication pending in Research Quarterly.

TABLE I

VALUES FOR CLASSIFICATION OF STUDENTS BASED ON MAXIMUM NUMBER OF PULL-UPS PERFORMED AT BODYWEIGHT*

BODY WEIGHT	NUMBER OF PULL-UPS																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
110	110	133	117	120	124	127	131	134	138	141	145	148	152	155	157	160	164	167	171	174	178	181	185	188	192	195
120	120	124	128	132	136	140	144	148	152	156	160	164	168	172	176	180	184	188	192	196	200	204	208	212	216	220
130	130	135	140	145	150	155	160	165	170	175	180	186	190	195	199	204	209	213	217	222	226	231	236	240	245	250
140	140	145	152	157	163	168	174	179	184	189	193	199	204	209	212	218	223	228	231	236	241	246	251	255	260	266
150	150	156	163	169	176	182	188	193	198	203	207	212	217	222	226	232	237	242	246	251	256	261	266	271	276	281
160	160	166	174	179	186	192	198	203	208	214	219	224	230	235	240	246	251	257	262	266	271	276	282	289	295	301
170	170	177	184	190	196	202	208	213	219	225	231	236	242	248	254	260	266	272	278	284	290	296	302	308	314	320
180	180	187	194	200	206	213	220	225	231	238	244	251	257	263	270	276	283	289	296	302	309	316	322	329	335	341
190	190	197	204	211	217	224	231	238	244	251	258	265	272	279	286	293	300	307	314	321	328	335	342	350	356	363
200	200	207	215	222	228	236	243	250	257	265	271	279	286	294	300	308	315	323	329	337	344	351	359	366	373	380
210	210	218	225	233	240	248	255	263	270	278	285	293	300	308	315	323	330	338	345	353	360	368	375	383	390	398
220	220	228	236	244	252	260	268	276	284	292	300	308	316	324	332	340	348	356	364	372	380	388	396	404	412	420
230	230	238	247	255	264	272	281	289	298	306	314	323	332	340	349	357	366	374	383	391	400	408	417	425	434	442

*Adapted from Richard A. Berger's, "Prediction of Chinning or Dipping Strength from Number of Repetitions Performed at Bodyweight." By permission of the author.

2. Explain the value of each exercise and how it contributes to fitness. Teach the basic physiology and anatomy involved, on the appropriate level. Use visual aids and assign readings in texts and resource materials.

3. Teach and emphasize proper breathing during the exercise and deep breathing during the rest intervals.

4. Thoroughly explain and demonstrate the correct lifting technique, methods of spotting, other safety aspects and class arrangement for each exercise and for rotation procedures.

5. Make sure spotters check the weights carefully, so that collars, or clamps, are secure.

6. Have students warm up properly before lifting. Stretching exercises should be included in the warm-up, along with circulatory and resistance movements (individual and partner isometrics are good for this purpose). Encourage students to begin warm up before the class is called to order.

7. Check traffic patterns and space around the lifting area and each station.

8. The teacher should move around checking and assisting students where needed.

Facilities and equipment

Area for the circuit should be no less than 40'x50'.
16 gym mats 4'x7' or 5'x10'; or rubber-door mats to protect the floor
10 sets of barbells
6 pairs of dumbbells
Record cards for individual students
16 large cards or posters, listing stations, describing and illustrating exercises.

A Power Training Circuit

(Presented as a pilot routine with the suggestion that teachers adapt the ideas to their own situations and carefully evaluate the procedures and the results)

Overview

Explosive power is a combination of strength and speed. More concisely, power is the ability to apply stength in a sudden movement. Obviously, the strength component is paramount.

After a desired degree of strength has been acquired, it may be helpful in developing explosive power, to introduce the element of speed. That is, to use a moderate overload (about 50 to 60% of maximum) and perform each exercise in a fast series of repetitions.

The following adaptation of the weight training circuit, described earlier, has been designed to promote the development of optimum power. Also built into the sequence is a heavy stress on the cardiorespiratory system, thus, gaining the added benefit of improved circulatory responses.

Layout and Procedure

The circuit consists of the same eight stations as described for "Strength Development." However at each station both a weight resistance exercise and a calisthenic exercise are performed. Each is done as fast as possible--as many repetitions as the performer can do, using correct form--during a prescribed exercise bout (10 seconds at the beginning of the program).

There are three students at each station. One performs the weight exercise while another acts as his "spotter." The third does the calisthenic exercise. The exercise bout begins on signal (one whistle), continues for 10 seconds, and ends on signal (two whistles). The performers quickly record the number of repetitions and then rotate positions (within 15 seconds) and the next bout is carried on. After the third bout, the "teams" of three performers rotate clockwise to the next station (15 seconds), where the procedure is repeated. This goes on until every performer has done all the exercises at all eight stations--a total of eight weight and eight calisthenic exercises. At the end of the fourth rotation the interval for changing is increased from 15 seconds to one minute to allow Nos. 2 and 3 of each team to check the weights and tighten the collars if necessary. Then the 10 sec. and 15 sec. interval cycle is resumed.

The entire circuit should be completed in not more than 12 minutes. A warmup of at least 3 minutes should be directed before beginning the circuit. Students should be encouraged to get on the floor as quickly as possible and begin warming up on their own before the class is started.

The stations and corresponding exercises for one circuit are as follows (The weight exercise is given first and the calisthenic exercise second:)

Station #8	Station #1
Backward Dumbbell Flings	Military Press
Squat	Bench Step
Station #7	**Station #2**
Situps	Upright Rowing
Pushups	Up Oars
Station #6	**Station #3**
Curls	Side Bends
Jumping Jacks	Squat Thrusts
Station #5	**Station #4**
Bench Press	Half Squats
Snap and Twist	Wing Stretcher

The exercises are described in a later section.

Rotation System:

First bout - No. 1 exercises with weights; No. 2 spots; No. 3 does calisthenic exercise.

Second bout - No. 2 exercises with weights; No. 3 spots; No. 1 does calisthenic exercise.

Third bout - No. 3 exercises with weights; No. 1 spots; No. 2 does calisthenic exercise.

Teams then rotate clockwise to the next station where the sequence is repeated.

At least two sets of stations (in effect, two separate circuits) should be laid out, one set using lighter weights than the other. Thus, the class can be organized into two basic groups. Individual differences are further identified and met by each member performing as many repetitions as he can on each exercise and constantly trying to improve his score. Every class member has a card on which he records his performance after every exercise (within the 15 seconds alloted for changing positions). Determine the weight for each exercise according to the group, as explained previously. The amount should be such that the weakest student can perform about five to eight repetitions and the strongest about ten to twelve. When the strongest students

reach about 15 to 18 repetitions, then the weight load can be increased. More difficult variations of the calisthenics can also be substituted.

As the students improve in explosive power, the teacher may wish to increase the exercise bouts from 10 to 15 seconds. This latter time may be considered a maximum interval, for it is probably more effective to increase the resistance than to lengthen the bout beyond 15 seconds.

As in "Strength Development" the directions can be recorded on tape. In fact, it is recommended that this be done so that the instructor will be free to work with the participants and not have to concentrate on the precise timing of 10 and 15 second intervals. In the absence of a tape recorder, a student leader or teacher aide should be trained to give the whistle signals.

PRESIDENT'S COUNCIL ON PHYSICAL FITNESS AND SPORTS
PHYSICAL FITNESS CLINIC

POWER TRAINING RECORD

Name _____ Grade _____ Age ____

Station and Exercise	Goal	No. Repetitions Completed								
		M	W	F	M	W	F	M	W	F
No. 1, Military Press Bench Step										
No. 2, Upright Rowing Up Oars										
No. 3, Side Bends Squat Thrusts										
No. 4, Half Squats Wing Stretcher										
No. 5, Bench Press Snap and Twist										
No. 6, Curls Jumping Jack										
No. 7, Sit Ups Push Ups										
No. 8, Backward Dumbbell Flings Squat Jumps										

Description of Weight Training Exercises
(Used in both "Strength" and "Power" Circuits)

1. Military Press

Starting Position ("Strength" Circuit): Stand erect with feet comfortably apart and chest high. With hands shoulder-width apart, grasp barbell with palms facing legs and raise bar to upper chest (palms now facing forward).

Starting Position ("Power" Circuit): Same as above except that the performer sits upright on a chair, feet firmly on the floor. (This prevents excessive back bend while performer is going as fast as he can go.) The spotter stands behind the chair, alert for the performer's possible loss of balance backward.

Action:

Count 1. Press bar upward overhead until elbows are fully extended.

Count 2. Lower bar to chest position.

Inhale when raising weight and exhale when lowering it. This exercise may also be performed from starting position with bar behind neck.

2. Upright Rowing

Starting Position: Stand erect with feet comfortably apart and hold bar in front of thighs, hands about 6" apart with palms facing legs.

Action:

Count 1. Pull bar up to the chin, bringing elbows higher than the shoulders.

Count 2. Lower bar to starting position.

Only shoulders and arms should move during this exercise. Inhale when raising weight and exhale when lowering it.

3. Side Bends

Starting Position: Stand erect, feet spread comfortably apart, about 10-12 inches; knees slightly flexed; arms at sides, each hand holding a dumbbell, knuckles out.

Action:

Count 1. Bend torso to the right as far as possible, keeping dumbbells near the body; avoid leaning forward or

backward; keep both feet flat on floor.

Count 2. Return to starting position.

Count 3. Bend to the left - as in Count 1.

Count 4. Return to starting position.

Exhale on Counts 1 and 3; inhale on Counts 2 and 4.

4. Half Squats

Starting Position ("Strength" Circuit): Stand erect with feet comfortably apart, heels on a 2'x4' board; rest barbells across shoulders behind neck, hands grasping bar with palms facing away from body.

Starting Position ("Power" Circuit): Same as above except performer stands in front of a chair. As he exercises he lowers body until he lightly touches chair seat. (This precludes squatting too deep or "cheating" by not bending knees far enough.) Spotter stands obliquely in front, for if the performer loses his balance it is more likely to be in forward direction.

Action:

Count 1. Lower body until knee joint is approximately at right angle.

Count 2. Straighten legs to erect position.

The heels should be kept in contact with the board when performing this exercise; also, keep head up and back straight. Exhale when squatting, straighten up from heels and inhale when rising to erect position.

5. Bench Press

Starting Position: Lie flat on bench on back with legs bent and astride bench, feet on floor. Grasp bar with hands more than shoulder width apart, palms away from face, and arms extended.

Action:

Count 1. Lower weights to chest, exhaling.

Count 2. Raise weights straight up, inhaling.

Spotters should assist in getting weights into position to lift and in taking weights after exercise is completed.

6. Curls

Starting Position: Stand erect, feet spread comfortably apart, about 10-12 inches; knees slightly flexed. Grasp bar with hands shoulder-width apart, palms facing out, arms extended downward with bar resting lightly against front of thighs.

Count 1. Flex elbows fully, lifting the bar upward toward chest. Keep elbows close to sides and avoid raising shoulders. Do not lean backward or "bounce" the bar with a leg motion.

Count 2. Return to starting position. Inhale on Count 1. Exhale on Count 2. Note: In "Power" Circuit, spotter stands behind the lifter, placing one hand in the middle of performer's back to resist a backward lean. Spotter should "synchronize" his resistance with the lifter's motions to avoid pushing him off balance forward as weight is being returned (Count 2).

7. Sit-Ups

Starting Position: Performer lies on his back with legs extended, feet about twelve inches apart. He holds a weight behind his neck. His partner holds the performer's ankles, keeping his heels in contact with the floor.

Action:

Count 1. Curl up to a sitting position, carrying through far enough to touch elbows to knees. The knees may be flexed slightly during this action.

Count 2. Return to starting position.

Note: The instructor must insist that the performer curl up. If it is necessary for the exerciser to arch his back while moving to the sitting position, it is an indication that the weight is too heavy to start with or that he has reached the maximum number of correct repetitions.

Caution the performers against "bouncing" up off the floor. The action should be smooth, curling up and down.

8. Backward Dumbbell Flings

Starting Position: Stand, bent forward at the waist; feet wide apart (20-30 inches); knees slightly flexed; trunk straight and parallel to ground; head up, looking forward. Grasp a dumbbell in each hand, palms toward side of body, arms hanging vertically downward.

Count 1. Fling arms backward and sideward from shoulders, raising dumbbells in arc as far as they will go; keep elbows extended. Hold body stable and avoid raising trunk or a "bouncing" motion with legs.

Count 2. Return the bells to starting position. Inhale on Count 1. Exhale on Count 2. Spotter stands diagonally in front of performer, watching for overbalance forward.

Description of Calisthenic Exercises*
(Used in "Power" Circuit)

1. Bench Step

   Starting Position: Performer stands erect behind a sturdy bench, approximately 16 inches high.

   Action:

   1. Step up on bench with one foot.
   2. Bring other foot up, so that performer is standing on bench, weight equally placed on both feet.
   3. Step back down on same foot used in Action 1.
   4. Return other foot to floor, performer ends in starting position.

   Repeat the action, leading with the opposite foot; the leading foot is changed after each repetition.

2. Up Oars (Blue Book, p. 66)

   Starting Position: Lie on back with arms extended behind head.

   Action:

   1. Curl up to sitting position, reach forward with the extended arms, meanwhile pulling the knees tightly against the chest. Arms are outside the knees.
   2. Return to starting position.

   The exercise is done rhythmically and without breaks in the movement.

3. Squat Thrust (Blue Book, p. 35)

   Starting Position: Stand at attention.

   Action:

   1. Bend knees and place hands on the floor in front of the feet. Arms may be between, outside, or in front of the bent knees.

* Illustrations of exercises 2, 3, 5-8 may be found in the PCPFS Blue Book at pages indicated. President's Council on Physical Fitness and Sports Youth Physical Fitness - Suggested Elements of a School-Centered Program. Revised January 1967. Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Price 40 cents.

2. Thrust the legs back far enough so that the body is perfectly straight from shoulders to feet (the pushup position).

3. Return to squat position.

4. Return to erect position.

4. Wing Stretcher

Starting Position: Stand erect, raise elbows shoulder height, arms flexed in front of chest, fingers extended, palms down; outstretched fingers of each hand almost touching.

Action:

1, 2, 3. Pull elbows back as far as possible, keeping arms at shoulder height and returning to starting position each time.

4. Swing arms outward and sideward, shoulder height, palms up and return to starting position.

Note: This is a bouncy, rhythmic action, counting "one-and-two-and-three-and-four-and."

5. Snap and Twist (Blue Book, p. 68)

Lie on back with arms extended behind the head.

Action:

1. With a vigorous action, curl up and bring the left knee to the chest while extending right arm forward and the left elbow backward, twisting trunk to the left. (This is an "explosive" type of movement.)

2. Return to the starting position.

3. Repeat the movement to the opposite side.

4. Return to starting position. The exercise is done rhythmically.

6. Jumping Jacks (Blue Book, p. 56)

Starting Position. Stand at attention.

Action:

1. Swing arms sideward and upward, lightly touching hands (fingertips) above head (arms straight) while simultaneously moving feet sideward and apart in a single jumping motion.

2. Spring back to the starting position

7. Push Ups (Blue Book, p. 28)

Starting Position: Extend arms and place hands on the floor, just under and slightly to the outside of the shoulders. Fingers should be pointing forward. Extend body so that it is perfectly straight. The weight is supported on the hands and toes.

Action:

1. Keeping body tense and straight, bend elbows and touch chest to the floor.

2. Return to original position. (The body must be kept perfectly straight. The buttocks must not be raised. The abdomen must not sag.)

8. Squat Jumps (Blue Book, p. 66)

Starting Position: Assume semisquat position, hands clasped on top of head, feet 4 to 6 inches apart, heel of left foot on line with toes of the right foot.

Action:

1. Spring upward from the floor, reversing the position of the feet and coming down to the semisquat position. Hands remain on head.

2. Same movement, reversing feet.

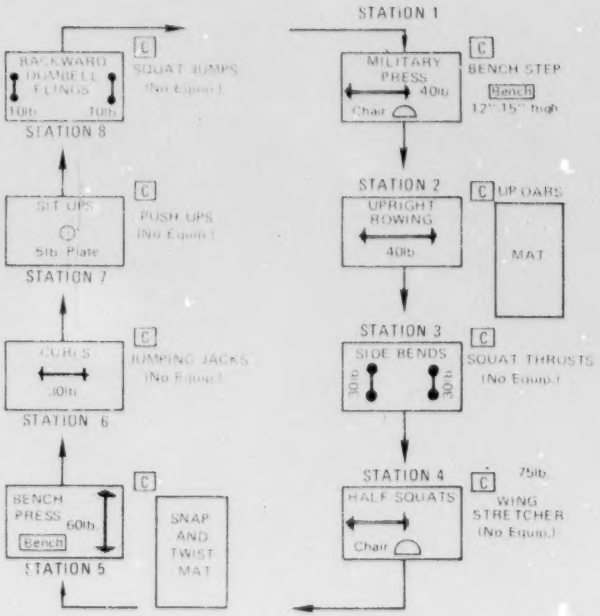
Continue, reversing feet on each upward jump.

PRESIDENT'S COUNCIL ON PHYSICAL FITNESS AND SPORTS

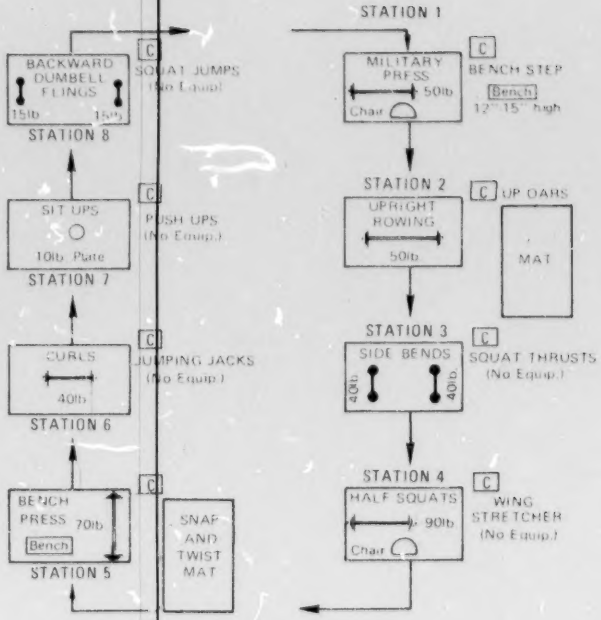
WEIGHT TRAINING FOR STRENGTH AND POWER

LAYOUT OF CIRCUITS

CIRCUIT A (BLUE)



CIRCUIT B (GOLD)



(1) AMOUNT OF WEIGHT SHOWN IS TOTAL, INCLUDING BARS AND COLLARS

(2) MATS ARE 4' x 7' OR SIMILAR SIZE

(3) DISTANCE BETWEEN MATS IS 4'-6' VERTICALLY AND 6'-8' HORIZONTALLY

(4) CUE CARD [C], PLACED IN FRONT, CENTER OF EACH STATION AREA

The amount of weight shown for the exercises above are just an estimate of what an average 11th grade class might handle in the Power Circuit. The Strength Circuit would require heavier loads. The teacher should adapt the weight resistance to his specific group.

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